

KEEPS (Kentucky Energy Efficiency Program for Schools)



Based on USEPA
Energy Star's Energy
Management Process



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**Kentucky
Pollution
Prevention
Center**

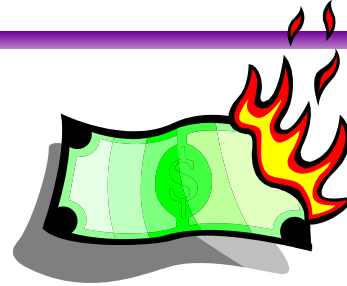
Why? Energy Affects Us Everywhere

- Buildings where we attend school, work, or shop
- Consume more than **\$80 BILLION** of natural gas and electricity each year
- Energy is consumed at peak times
- Contributes to greenhouse gas emissions



Why is KEEPS Important?

- Energy Costs increasing



- Could your district save 5 – 10%?



- How could you better spend the avoided costs?

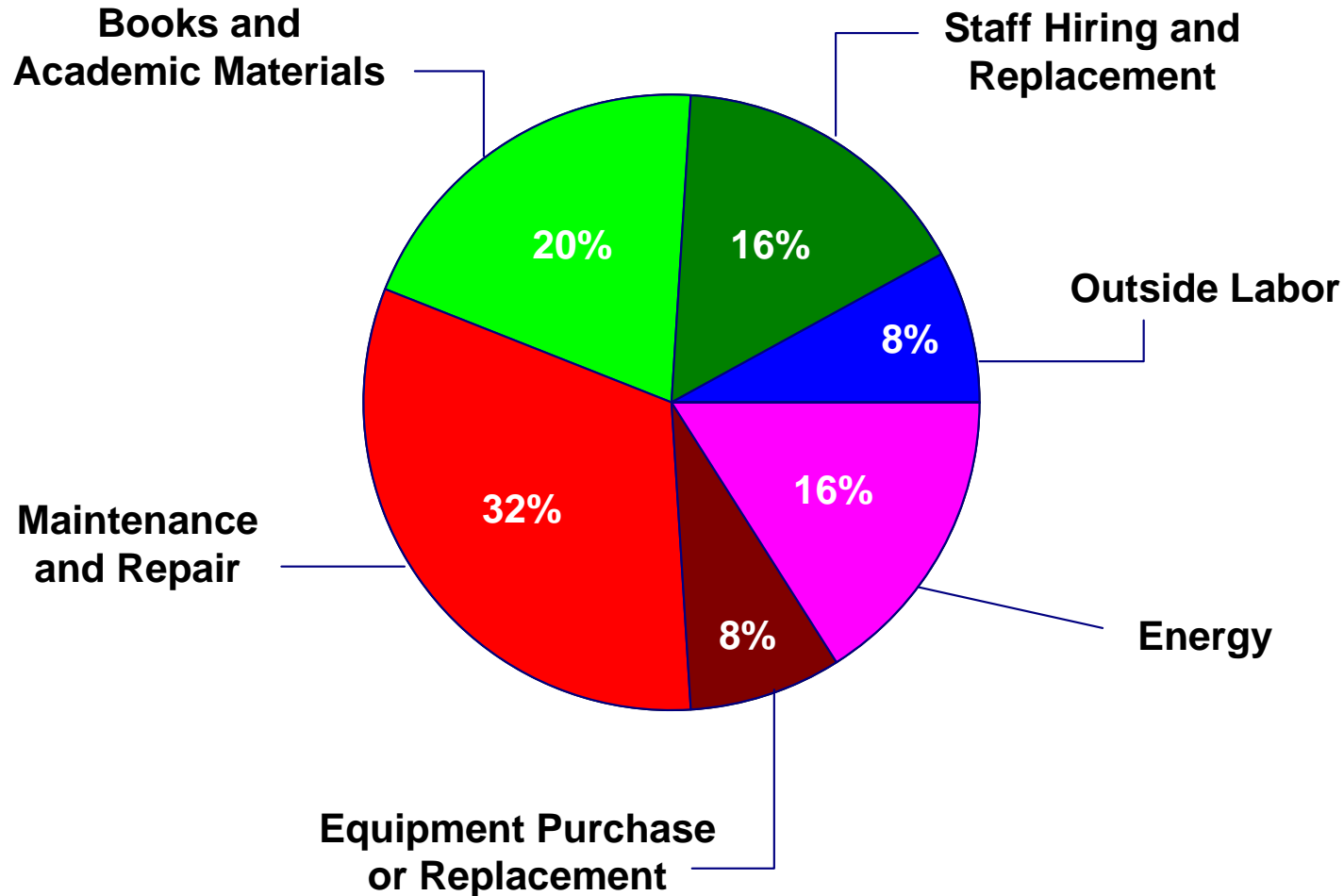


- Money saved can be reinvested in students



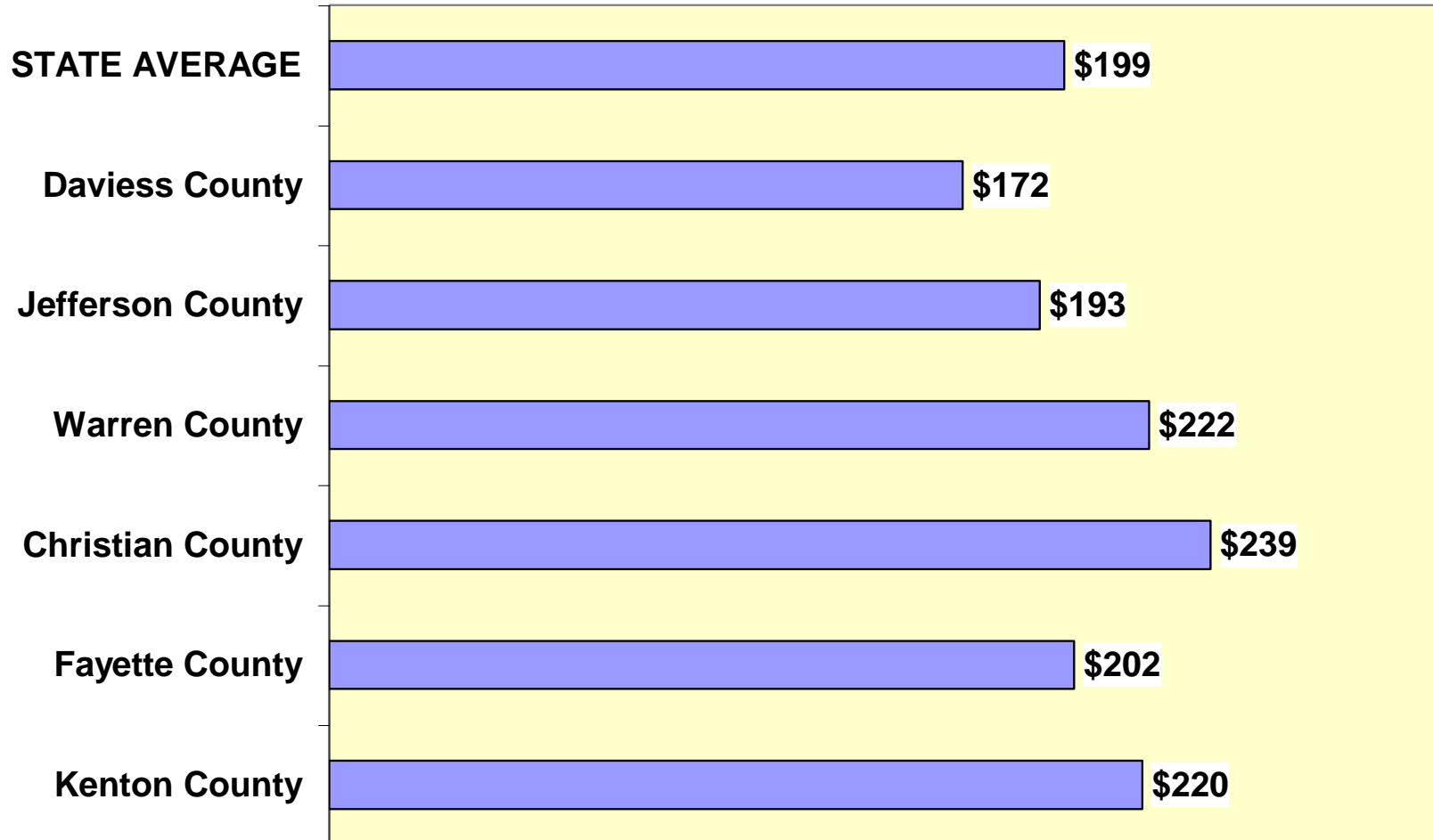
Energy as a Percentage of Costs

Controllable Costs (typical example)



Energy Costs per Student

FY 2004 Energy Costs per ADA



Energy Star – a Proven System



Step	Task	Status	Start	Finish	Complete	Responsible	Resource(s)
1	Make Commitment to Continuous Improvement		12-Jul-06				
1.1	Create an Energy Program: Agree & Sign KEEPS Memorandum of Agreement (MOA)	COMPLETE	12-Jul-06	30-Aug-06	26-Jul-06	Board, Pres	BF
1.1.1	Hire/Appoint an Energy Auditor/Manager	COMPLETE	12-Jul-06	30-Sep-06	26-Jul-06	Pres	Core Team
1.1.2	Establish a Cross-Functional Energy Team	COMPLETE	12-Jul-06	30-Sep-06	26-Jul-06	Pres	Core Team
1.1.3	Schedule Energy Team's Monthly Meetings	COMPLETE	12-Jul-06	30-Sep-06	8-Aug-06	EM	E2 Team, BF
1.1.3.1	September 06 Energy Team Meeting	COMPLETE	12-Jul-06	12-Sep-06	12-Sep-06	EM, E2 Team	BF
1.1.3.2	October 06 Energy Team Meeting	COMPLETE	12-Jul-06	10-Oct-06	10-Oct-06	EM, E2 Team	BF
1.1.3.3	November 06 Energy Team Meeting	COMPLETE	12-Jul-06	14-Nov-06	14-Nov-06	EM, E2 Team	BF
1.1.3.4	December 06 Energy Team Meeting	RED	12-Jul-06	12-Dec-06		EM, E2 Team	BF
1.1.3.5	January 07 Energy Team Meeting	AMBER	12-Jul-06	9-Jan-07		EM, E2 Team	BF
1.1.3.6	February 07 Energy Team Meeting	GREEN	12-Jul-06	13-Feb-07		EM, E2 Team	BF
1.1.3.7	March 07 Energy Team Meeting	GREEN	12-Jul-06	13-Mar-07		EM, E2 Team	BF
1.1.3.8	April 07 Energy Team Meeting	GREEN	12-Jul-06	10-Apr-07		EM, E2 Team	BF
1.1.3.9	May 07 Energy Team Meeting	GREEN	12-Jul-06	8-May-07		EM, E2 Team	BF
1.1.3.10	June 07 Energy Team Meeting	GREEN	12-Jul-06	12-Jun-07		EM, E2 Team	BF
1.2	Institute an Energy Policy	COMPLETE	12-Jul-06	30-Oct-06	10-Oct-06	Board, Pres	EM, E2 Team
1.3	Develop Plan for KEEPS Approved Training	COMPLETE	23-Jun-06	12-Oct-06	12-Oct-06	BF	EM, E2 Team
1.3.1	KEEPS Approved Training #1: KPPC/KESC Workshop (Louisville)	COMPLETE	23-Jun-06	21-Sep-06	20-Sep-06	EM, E2 Team	KPPC, KESC
1.3.2	KEEPS Approved Training #2: Basic Energy Management	AMBER	23-Jun-06	30-Dec-06		EM, E2 Team	KPPC
1.3.3	KEEPS Approved Training #3: High Performance Sustainable Schools Conference	GREEN	23-Jun-06	30-May-07		EM, E2 Team	KPPC
1.4	Become an ENERGY STAR Partner	COMPLETE	1-Sep-06	15-Nov-06	23-Oct-06	BF	EM, E2 Team
2	Assess Performance & Opportunities						
2.1	Establish a system to gather & track energy-use data	COMPLETE	12-Jul-06	30-Sep-06	27-Jul-06	BF, SK	EM, E2 Team
2.1.1	Inventory all energy purchased & generated on-site in physical units & on a cost basis	COMPLETE	12-Jul-06	30-Sep-06	27-Jul-06	EM	BF, SK, E2 Team
2.1.2	Collect available data & pursue missing data	COMPLETE	12-Jul-06	30-Sep-06	27-Jul-06	EM	BF, SK, E2 Team
2.1.3	Develop tracking system (Review existing, purchase & implement system)	COMPLETE	12-Jul-06	30-Sep-06	27-Jul-06	EM	BF, SK, E2 Team
2.2	Normalize - look at seasons & months not as active	COMPLETE	12-Jul-06	31-Oct-06	27-Jul-06	EM	BF, SK, E2 Team
2.3	Establish baselines for all energy use points (Prioritize Bids. for E2 Assessments)	COMPLETE	12-Jul-06	31-Oct-06	27-Jul-06	EM	BF, SK, E2 Team
2.3.1	ENERGY STAR Portfolio Manager used for Scoring & Benchmarking Buildings (10%)	AMBER	1-Oct-06	30-Dec-06		EM	BF, SK, E2 Team

KEEPS ENERGY STAR® Energy Management Assessment Matrix

	Little or no evidence	Some elements	Fully Implemented		Next Steps
Step 1. Make Commitment to Continuous Improvement					
Energy Manager	No central or organizational resource Decentralized management	Central or organizational resource not empowered	Empowered central or organizational leader with senior mgmt support		
Energy Team	No school energy network	Informal organization	Active cross-functional team guiding the energy program		
Energy Policy	No formal policy	Referenced in environmental or other policies	Formal stand alone EE policy endorsed by senior mgmt		
Step 2. Assess Performance and Opportunities					
Gather and Track Data	Little metering/No tracking	Local or partial metering/tracking/reporting	All buildings report for central consolidation/analysis		
Normalize	Not addressed	Some unit measures or weather adjustments	All meaningful adjustments for organizational analysis		
Establish Baselines	No baselines	Various building-established	Standardized organizational base year and metric established		
Benchmark	Not addressed or only same site historical comparisons	Some internal comparisons among different buildings which are similar	Regular internal and external comparisons & analyses		
Analyze	Not addressed	Some attempts to identify and correct spikes	Profiles identifying trends, peaks, valleys and causes		
Technical assessments & audits	Not conducted	Internal facility reviews	Reviews by multi-functional team of professionals		
Step 3. Set Performance Goals					
Determine scope	No quantifiable goals	Short term building goals or nominal institutional goals	Short & long term building and organizational goals		
Estimate potential for improvement	No process in place	Specific projects based on limited vendor practices	Building and organizational defined based on experience		



Commit to Improved Performance

➤ **Appoint an Energy Manager/Auditor**

- ✓ **Some hire an individual FTE**

➤ **Establish an Energy Team**

- ✓ **Cross functional membership**

- **Teacher Student Parent**
- **Administrator Plant Services Custodian**
- **Food Service**

➤ **Implement an Energy Policy**

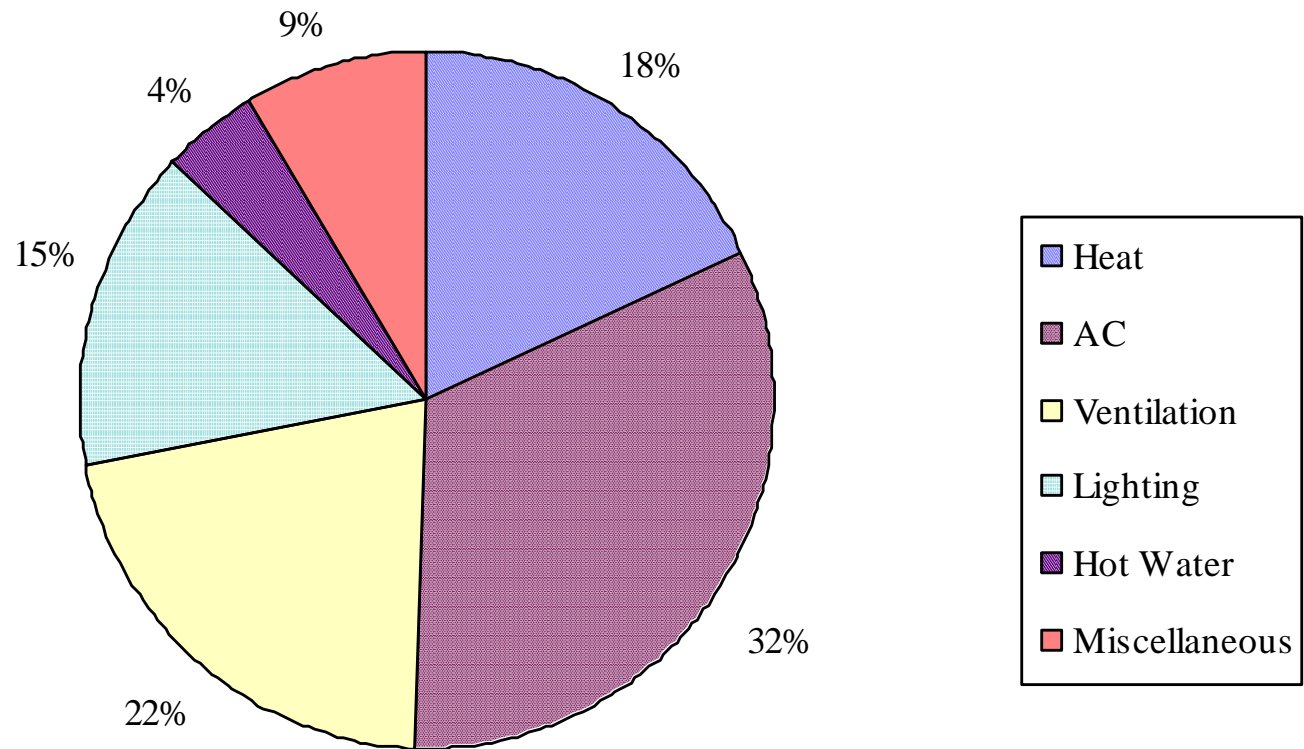
- ✓ **What works for your district**

Assess Performance

- **Energy efficiency assessments consist of:**
 - ✓ **On-site visit & assessment of processes**
 - ✓ **Comprehensive reviews conducted by**
 - **energy professionals (CEMs)**
 - **and/or engineers**
 - ✓ **Evaluating the actual facility performance**
 - ✓ **Compare actual performance to designed performance levels or against best available technology**
- **Set goals**

Energy Management Opportunities

**Annual Energy (MMBtu) Usage by
Percentage and Cost**



KPPC E2 Assessment Findings

County	Bldg Size	Energy Cost	Energy Savings	Potential % Savings
Jefferson	249,716	\$200,295	\$49,850	24.89%
Jefferson	107,195	\$99,931	\$16,910	16.92%
Boyd	107,600	\$116,655	\$36,510	31.30%
Fayette	271,514	\$301,124	\$33,656	11.18%
Jefferson	83,622	\$119,240	\$20,700	17.36%
Jefferson	120,513	\$117,737	\$33,460	28.42%
Jefferson	100,329	\$120,696	\$21,400	17.73%
Fayette	46,652	\$62,533	\$8,899	14.23%
Jefferson	35,186	\$194,450	\$18,385	9.45%
Jefferson	16,043	\$194,450	\$19,278	9.91%
Jefferson	45,400	\$54,814	\$13,534	24.69%
Total		\$1,581,925	\$272,582	17.23%

Next Steps

- **Create Action Plan**
 - ✓ **Communication plan**
 - ✓ **Raise awareness**
- **Implement Action Plan**
 - ✓ **Expand capacity**
 - **Training and information**
 - **Successful practices**
- **Motivate**
- **Track and monitor**



Next Steps

➤ Evaluate Progress

- ✓ What is working?
- ✓ What is not?
- ✓ Can we improve more?
- ✓ Do we revise goals or action plan?

➤ Recognize achievements

- ✓ School Board
- ✓ Community
- ✓ Legislators



KEEPS Commitment

- **KPPC personnel will commit to the following activities:**
 - ✓ **Facilitate/participate on the Energy Team**
 - ✓ **Help develop Energy Policy & set energy goals**
 - ✓ **Provide energy related engineering services:**
 - **Assisting with energy data collection & management**
 - **Assistance in establishing baselines & benchmarks**
 - **Assist with conducting energy assessments**
 - **Providing training on Energy Star materials**



KEEPS Commitment

- **KPPC personnel will commit to the following activities:**
 - ✓ **Provide technical training**
 - ✓ **Assist with Energy Savings Performance Contract (ESPC)**
 - capital budget projects
 - ✓ **Assist with marketing success stories**
 - ✓ **Coordination between USDOE, USEPA, GOEP and the Energy Manager**



Become Part of the Solution

➤ EPA Challenge

- ✓ Improve building energy efficiency by **10% OR MORE**

➤ Energy Efficiency

- ✓ Opportunities for cost-effective reduction of pollution and greenhouse gas emissions
- ✓ Ensures sustainable energy resources
- ✓ Reduces operating expenses



E2 = Less GHG Emissions

- **Electricity Reduced/Saved – 2,738,480 kWh**
- **Save 375 Metric Tons of Coal**
- **Reduce CO₂ by 1,698 Metric Tons**
- **Reduce Methane by 14,068 Metric Tons**
- **Reduce Nitrous Oxide (NO_x) by 24,334 Metric Tons**

Note: Reductions possible if E2 opportunities were implemented for 11 buildings of the Partnership for a Green City.

Drawbacks?

- **Takes time from busy people**
 - ✓ **Some people are glad to volunteer**
 - ✓ **Time is an investment**
- **Grant funded**
 - ✓ **Develop a business model**
 - ✓ **Membership fees in future?**
 - **We work for more grant funding**
 - **Trying to get support of Legislators**
- **Schools move at their pace**

Benefits

- **Avoided costs –**
 - ✓ How could you better spend \$\$
- **Energy awareness -**
 - ✓ Students, Faculty, Staff, Administration and Board of Education
 - School & Home
- **National Energy Education Development (NEED) project**
- **KY School Plant Management Assoc. (KSPMA)**
- **Schools move at their pace**

YOU Can Make a Difference



- **Spread the message about energy efficiency**
- **Lead by example**
- **Improve your quality of life**
- **Secure a clean future for your children**

Need More Information?

- **Kentucky Pollution Prevention Center (KPPC)**
- **Brent Fryrear, KEEPS Coordinator**
- **502-852-0843**
- **bfryrear@louisville.edu**

- **www.kppc.org/KEEPS**

- **Cam Metcalf, Executive Director**
- **502-852-0965**
- **cam.metcalf@louisville.edu**



Bullitt County Public Schools and KEEPS



Managing Energy is Essential for Growing District

- BCPS has 23 schools plus 6 additional facilities, over 1.6 million square feet.
- Built 3 new schools, adding on and renovating our 3 high schools.
- Need to manage limited resources that all districts are faced with.

KEEPS program helps develop a Management Approach Based on BCPS' Culture to Realize Energy Saving Opportunities

- KEEPS provides a system to follow to establish an energy management program.
- Focus on educating faculty, students, administration, custodial and maintenance staff on how their actions affect energy and water usage
- Continuous Improvement

First Step: Energy Team

- Made up of teachers, administration, maintenance, etc.
- Energy Team helped prepare a district energy plan. Board approved in February.
- Energy team assists with Energy Assessments and sets goals based on energy saving measures identified.
- Helps promote program.

Utility Bill Analysis

- Collected utility usage and billing histories back to January 2004.
- Tracking 92 meters (electric, gas & water).
- Using an internet based program.

Utility Bill Analysis, cont.

- By looking at utility bills alone, identified almost \$40,000 worth of savings/cost avoidance opportunities
 - Accounts charged State Tax-refund opportunity
 - Abandoned meter since August 2005 (customer charge was \$280 a month)
 - Graphing data makes it easy to see abnormal spikes in usage.

Energy Assessments

- KPPC assists with the assessments and prepares reports. We decide the plan that works best for us.
- Members of the Energy Team are involved with the assessment and are trained on what to look for. This will enable us to do follow up assessments every year on our own.
- KPPC provides us with necessary tools.

NEED Project

- Want to involve the students as much as possible in our Energy Management Program.
- Students assist with energy assessments.
- One of our Middle Schools will be starting NEED in their after school science club.

Challenges

- Getting everyone on board for a new program.
- Have to clear up misconceptions about energy conservation program.
- Need support from everyone so energy saving measures can be implemented.

Goals

- Develop a management approach to realize energy saving opportunities
- Reduce Utility Costs and reallocate those funds for other things needed in the school district.
- Improve the learning facilities for students while reducing the impact on the environment.

“If our kids are going to change the world, they need to learn how.” – David Suzuki

KEEPS

Thomas More College

What have we learned

- Importance of tracking energy data
- How we can use all the information listed on our G & E bills
- How to look at energy data in different ways
- How efficient we are today with our current systems
- How to develop an Energy Policy
- The importance of Benchmarking
- The need to keep it simple

Anticipated Benefits

- Development of an Energy Policy
- Create more energy consumption awareness on campus
- Become more energy efficient on a daily basis
- Lower our energy costs
- Substitute with more energy efficient materials (i.e. lighting, motors, systems, etc.) as budgets allow.

Account # (Meter #)	Building	Cost Center	Department	5/24 - 6/23/05		6/23 - 7/24/05	
				Actual Charge	Usage	Actual Charge	Usage
1 0150-0759-01-8	Administration Gas & Elec Includes Ack. & How/Mar lighting	Allocated to:		\$15,449.17	253,698 kWh	\$16,502.81	288,384 kWh
		10-7001-5401 (44%) Administration Build.	Facilities	\$6,797.63	590 CCF	\$7,261.24	480 CCF
		10-7501-5401 (15%) Foodservice	Foodservice	\$2,317.38		\$2,475.42	
		10-7502-5401 (.5%) Foodservice Banquets	Foodservice	\$77.25		\$82.51	
		10-7510-5401 (.5%) Bookstore	Bookstore	\$77.25		\$82.51	
		10-7515-5401 (20%) Howard/Marion	Facilities	\$3,089.83		\$3,300.56	
		10-7516-5401 (20%) Ackerman	Facilities	\$3,089.83		\$3,300.56	
2 0780-0871-20-9	Ackerman Electric Includes Howard Heat & A/C	10-7516-5401	Facilities	\$1,319.40	15,200 kWh	\$2,060.79	33,960 kWh
3 7410-0624-20-0	Ackerman Gas	10-7516-5401	Facilities	\$228.07	193 CCF	\$244.59	204 CCF
4 9720-0787-20-3	CCC Electric Includes Parking Lot Lights	10-7010-5401	Facilities	\$3,912.41	66,720 kWh	\$4,229.98	76,320 kWh
5 3550-0787-20-0	CCC Gas	10-7010-5401	Facilities	\$187.14	153 CCF	\$197.39	159 CCF
6 4310-2220-01-4	Murphy Hall Gas & Electric	10-7514-5401	Facilities	\$2,469.94	35,400 kWh	\$2,810.76	45,000 kWh
7 6410-0624-20-4	Howard/Marion Gas	10-7515-5401	Facilities	\$127.79	95 CCF	\$123.95	89 CCF
8 5010-2144-01-2	Student Center Gas & Electric	10-7518-5401	Facilities	\$3,081.49	45,600 kWh	\$3,926.62	69,120 kWh
9 8470-0703-20-6	Bank	10-7001-5401	Facilities	\$14.42	223 CCF	\$15.02	113 CCF
10 8350-2055-01-4	Art Building (Quonset Hut)	10-7001-5401	Facilities	\$14.42	136 kWh	\$15.02	145 kWh
11 8520-0707-20-1	Parkway (Baseball Dugouts)	10-7001-5401	Facilities	\$10.60	80 kWh	\$10.60	80 kWh
12 1780-0871-20-4	Fountain Front Lake	10-7001-5401	Facilities	\$39.67	507 kWh	\$41.31	531 kWh
13 2880-2246-01-5	Observatory	10-6237-5401	Facilities	\$10.58	4 kWh	\$10.58	4 kWh
15	Biology Field Station	10-6237-5401	Physics	\$14.54	138 kWh	\$17.14	176 kWh
		10-6201-5401	Biology				

Cost Center	5/24 - 6/23/05	6/23 - 7/24/05
10-7001-5401 Facilities	\$6,872.90	\$7,338.75
10-7010-5401 CCC	\$4,099.55	\$4,427.37
10-7501-5401 Foodservice	\$2,317.38	\$2,475.42
10-7502-5401 Foodservice	\$77.25	\$82.51
10-7510-5401 Bookstore	\$77.25	\$82.51
10-7514-5401 Murphy Hall	\$2,469.94	\$2,810.76
10-7515-5401 How/Mar	\$3,217.62	\$3,424.51
10-7516-5401 Ackerman	\$4,637.30	\$5,605.94
10-7518-5401 Student Ctr.	\$3,081.49	\$3,926.62
10-6237-5401 Observatory	\$14.54	\$17.14
10-6201-5401 Biology		
Total	\$26,865.22	\$30,191.54

Total - Facilities Accounts Only - (Non - shaded) **\$24,378.81**

\$27,533.95

Energy Cost Index \$/sq ft 372,364 sq ft	\$1.26
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1/25/06 - 2/23/06		2/23/06 - 3/23/06		3/23/06 - 4/24/06		4/24/06 - 5/23/06	
Actual Charge	Usage	Actual Charge	Usage	Actual Charge	Usage	Actual Charge	Usage
\$25,583.57	233,456 kWh	\$19,770.66	215,581 kWh	\$17,553.74	235,400 kWh	\$14,227.43	217,056 kWh
\$11,256.77	10,360 CCF	\$8,699.09	7,030 CCF	\$7,723.65	3,780 CCF	\$6,260.07	540 CCF
\$3,837.54		\$2,965.60		\$2,633.06		\$2,134.11	
\$127.92		\$98.85		\$87.77		\$71.14	
\$127.92		\$98.85		\$87.77		\$71.14	
\$5,116.71		\$3,954.13		\$3,510.75		\$2,845.49	
\$5,116.71		\$3,954.13		\$3,510.75		\$2,845.49	
\$10.30	0 kWh	\$10.30	0 kWh	\$10.30	0 kWh	\$265.53	1,320 kWh
\$7,613.33	5,922 CCF	\$5,063.90	4,219 CCF	\$2,735.82	2,382 CCF	\$368.76	279 CCF
\$3,249.28	51,360 kWh	\$2,919.41	43,200 kWh	\$3,572.45	56,160 kWh	\$3,667.21	55,200 kWh
\$2,474.85	1,912 CCF	\$1,664.03	1,369 CCF	\$776.56	657 CCF	\$384.69	261 CCF
\$6,279.39	37,200 kWh 3,044 CCF	\$4,763.01	33,600 kWh 2,118 CCF	\$4,013.67	42,000 kWh 1,235 CCF	\$3,102.57	30,300 kWh 668 CCF
\$646.43	495 CCF	\$462.75	362 CCF	\$540.70	449 CCF	\$287.62	212 CCF
\$5,986.24	31,200 kWh 2,900 CCF	\$4,678.34	29,760 kWh 2,065 CCF	\$3,785.94	37,920 kWh 1,093 CCF	\$2,560.39	31,200 kWh 89 CCF
\$18.29	193 kWh	\$17.33	179 kWh	\$16.79	171 kWh	\$15.82	145 kWh
\$0.00	80 kWh	\$10.53	80 kWh	\$13.33	120 kWh	\$8.52	40 kWh
\$41.04	527 kWh	\$39.94	511 kWh	\$39.67	507 kWh	\$36.51	433 kWh
\$10.51	3 kWh	\$10.58	4 kWh	\$10.58	4 kWh	\$11.09	4 kWh
\$20.73	229 kWh	\$18.29	193 kWh	\$16.05	160 kWh	\$13.87	117 kWh

1/25/06 - 2/23/06
\$11,326.61
\$5,724.13
\$3,837.54
\$127.92
\$127.92
\$6,279.39
\$5,763.14
\$12,740.34
\$5,986.24
\$20.73
\$51,933.96

2/23 - 3/23/06
\$8,777.47
\$4,583.44
\$2,965.60
\$98.85
\$98.85
\$4,763.01
\$4,416.88
\$9,028.33
\$4,678.34
\$18.29
\$39,429.07

3/23 - 4/24/06
\$7,804.02
\$4,349.01
\$2,633.06
\$87.77
\$87.77
\$4,013.67
\$4,051.45
\$6,256.87
\$3,785.94
\$16.05
\$33,085.60

4/24 - 5/23/06
\$6,332.01
\$4,051.90
\$2,134.11
\$71.14
\$71.14
\$3,102.57
\$3,133.11
\$3,479.78
\$2,560.39
\$13.87
\$24,950.01

Fiscal Total
\$107,768.75
\$59,274.74
\$36,427.50
\$1,214.25
\$1,214.25
\$54,212.35
\$53,252.03
\$99,640.76
\$54,110.77
\$216.45
\$0.00
\$467,331.86

\$47,819.86

\$36,247.47

\$30,260.95

\$22,659.75

\$428,259.41

Orig. 05/06 Facilities Budget	\$410,950.00
(Approved 04-15-05)	
05/06 Actual vs. Budget	\$17,309.41

Actual 04/05 Facilities G & E (Last Yr)	\$383,780.18
05/06 Actual vs 04/05	\$44,479.23

				5/24 - 6/23/05		6/23 - 7/24/05	
Account # (Meter #)	Building	Cost Center	Gas/Electric	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage
1 0150-0759-01-8	Administration Electric Administration Gas Includes Ack. & How/Mar lighting	Allocated to:	kWh	246,064	253,698	244,126	288,384
		10-7001-5401 (44%) Administration Build.	CCF	310	590	230	480
		10-7501-5401 (15%) Foodservice					
		10-7502-5401 (.5%) Foodservice Banquets					
		10-7510-5401 (.5%) Bookstore					
		10-7515-5401 (20%) Howard/Marion					
		10-7516-5401 (20%) Ackerman					
2 0780-0871-20-9	Ackerman Electric Includes Howard Heat & A/C	10-7516-5401	kWh	22,520	15,200	24,760	33,960
3 7410-0624-20-0	Ackerman Gas	10-7516-5401	CCF	177	193	150	204
4 9720-0787-20-3	CCC Electric Includes Parking Lot Lights	10-7010-5401	kWh	69,120	66,720	77,280	76,320
5 3550-0787-20-0	CCC Gas	10-7010-5401	CCF	131	153	162	159
6 4310-2220-01-4	Murphy Hall Electric	10-7514-5401	kWh	32,700	35,400	38,700	45,000
	Murphy Hall Gas		CCF	136	191	141	184
7 6410-0624-20-4	Howard/Marion Gas	10-7515-5401	CCF	100	95	88	89
8 5010-2144-01-2	Student Center Electric	10-7518-5401	kWh	43,680	45,600	46,560	69,120
	Student Center Gas		CCF	409	223	66	113
9 8470-0703-20-6	Bank	10-7001-5401	kWh	0	136	0	145
10 8350-2055-01-4	Art Building (Quonset Hut)	10-7001-5401	kWh	120	80	160	80
11 8520-0707-20-1	Parkway (Baseball Dugouts)	10-7001-5401	kWh	493	507	499	531
12 1780-0871-20-4	Fountain Front Lake	10-7001-5401	kWh	3	4	4	4
13 2880-2246-01-5	Observatory	10-6237-5401	kWh	125	136	136	176
			Totals	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage
			kWh	414,825	417,481	432,225	513,720
			CCF	1,263	1,445	837	1,229
				Plus/Minus		Plus/Minus	
				kWh	0.64%	kWh	18.85%
				CCF	14.41%	CCF	46.83%

1/25/06 - 2/23/06		2/23/06 - 3/23/06		3/23/06 - 4/24/06		4/24/06 - 5/23/06		TOTALS	TOTALS	Plus/Minus		
04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage			
236,921	233,456	223,130	215,581	256,138	235,400	228,790	217,056	2913014	3010775	kWh	97761	
10,020	10,360	10,070	7,030	3,840	3,780	2,110	540	57720	55520	CCF	(2200)	
0	0	0	0	2,320	0	3,600	1,320	100560	130720	kWh	30160	
5,362	5,922	5,137	4,219	2,176	2,382	1,135	279	30882	30699	CCF	(183)	
49,440	51,360	42,240	43,200	61,920	56,160	58,560	55,200	737200	729120	kWh	(8080)	
2,307	1,912	2,378	1,369	783	657	432	261	13394	10777	CCF	(2617)	
37,200	37,200	32,700	33,600	43,500	42,000	31,200	30,300	460200	488100	kWh	27900	
3,289	3,044	3,131	2,118	1,415	1,235	701	668	18428	17345	CCF	(1083)	
459	495	352	362	420	449	203	212	3289	3321	CCF	32	
31,200	31,200	28,800	29,760	42,240	37,920	36,000	31,200	460800	510720	kWh	49920	
2,808	2,900	2,697	2,065	1,432	1,093	858	89	17753	15493	CCF	(2260)	
1	193	93	179	188	171	148	145	431	2128	kWh	1697	
40	80	80	80	40	120	40	40	1320	880	kWh	(440)	
540	527	487	511	602	507	486	433	6313	5943	kWh	(370)	
4	3	3	4	4	4	4	4	47	47	kWh	0	
233	229	231	193	182	160	124	117	2527	2258	kWh	(269)	
04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage	04/05 Usage	05/06 Usage	YTD Plus/Minus		
355,579	354,248	327,764	323,108	407,134	372,442	358,952	335,815	4,682,412	4,880,691	kWh	198,279	4.23%
24,245	24,633	23,765	17,163	10,066	9,596	5,439	2,049	141,466	133,155	CCF	(8,311)	-5.87%
Plus/Minus		Plus/Minus		Plus/Minus		Plus/Minus						
kWh	-0.37%	kWh	-1.42%	kWh	-8.52%	kWh	-6.45%					
CCF	1.60%	CCF	-27.78%	CCF	-4.67%	CCF	-62.33%					

05 / 06

Administration Building

% Gas and Electric Charges

Account # 0150-0759-01-8

Building	Date	Gas \$	Electric \$	Tax \$	Total	% Gas	% Electric	% Tax	
Adminstration	5/24/05-6/23/05	\$615.84	\$14,383.35	\$449.98	\$15,449.17	3.99%	93.10%	2.91%	100.00%
	6/23/05-7/24/05	\$518.61	\$15,503.53	\$480.67	\$16,502.81	3.14%	93.94%	2.91%	100.00%
	7/24/05-8/23/05	\$758.32	\$15,616.60	\$491.25	\$16,866.17	4.50%	92.59%	2.91%	100.00%
	8/23/05-9/22/05	\$1,157.69	\$16,380.09	\$526.14	\$18,063.92	6.41%	90.68%	2.91%	100.00%
	9/22/05-10/21/05	\$1,408.30	\$14,558.33	\$478.99	\$16,445.62	8.56%	88.52%	2.91%	100.00%
	10/21/05-11/21/05	\$8,929.80	\$12,846.79	\$653.30	\$22,429.89	39.81%	57.28%	2.91%	100.00%
	11/21/05-12/22/05	\$19,087.43	\$11,933.75	\$930.63	\$31,951.81	59.74%	37.35%	2.91%	100.00%
	12/22/05-1/25/06	\$15,477.91	\$11,711.62	\$815.69	\$28,005.22	55.27%	41.82%	2.91%	100.00%
	1/25/06-2/23/06	\$12,908.42	\$11,930.00	\$745.15	\$25,583.57	50.46%	46.63%	2.91%	100.00%
	2/23/06-3/23/06	\$8,172.07	\$11,022.74	\$575.85	\$19,770.66	41.33%	55.75%	2.91%	100.00%
	3/23/06-4/24/06	\$4,197.41	\$12,845.16	\$511.27	\$17,553.84	23.91%	73.18%	2.91%	100.00%
	4/24/06-5/23/06	\$664.87	\$12,320.86	\$389.57	\$13,375.30	4.97%	92.12%	2.91%	100.00%
	Totals	\$73,896.67	\$161,052.82	\$7,048.49	\$241,997.98	30.54%	66.55%	2.91%	100.00%

		% Gas	% Electric
Take out taxes	\$234,949.49	31.45%	68.55%

Energy Cost Index \$1.15
 \$/sq ft
 203,669 sq ft

05 / 06

Murphy Hall

% Gas and Electric Charges

Account # 4310-2220-01-4

Building	Date	Gas \$	Electric \$	Tax \$	Total	% Gas	% Electric	% Tax	
Murphy Hall	5/24/05-6/23/05	\$219.44	\$2,178.56	\$71.94	\$2,469.94	8.88%	88.20%	2.91%	100.00%
	6/23/05-7/24/05	\$217.10	\$2,511.80	\$81.86	\$2,810.76	7.72%	89.36%	2.91%	100.00%
	7/24/05-8/23/05	\$235.60	\$2,446.43	\$80.46	\$2,762.49	8.53%	88.56%	2.91%	100.00%
	8/23/05-9/22/05	\$474.05	\$3,078.43	\$106.57	\$3,659.05	12.96%	84.13%	2.91%	100.00%
	9/22/05-10/21/05	\$676.70	\$2,782.64	\$103.78	\$3,563.12	18.99%	78.10%	2.91%	100.00%
	10/21/05-11/21/05	\$2,684.79	\$2,712.95	\$161.93	\$5,559.67	48.29%	48.80%	2.91%	100.00%
	11/21/05-12/22/05	\$5,784.64	\$2,306.06	\$242.72	\$8,333.42	69.41%	27.67%	2.91%	100.00%
	12/22/05-1/25/06	\$4,411.90	\$2,282.52	\$200.84	\$6,895.26	63.98%	33.10%	2.91%	100.00%
	1/25/06-2/23/06	\$3,813.97	\$2,282.52	\$182.90	\$6,279.39	60.74%	36.35%	2.91%	100.00%
	2/23/06-3/23/06	\$2,483.05	\$2,141.23	\$138.73	\$4,763.01	52.13%	44.96%	2.91%	100.00%
	3/23/06-4/24/06	\$1,391.58	\$2,505.18	\$116.91	\$4,013.67	34.67%	62.42%	2.91%	100.00%
	4/24/06-5/23/06	\$815.37	\$2,007.67	\$84.69	\$2,907.73	28.04%	69.05%	2.91%	100.00%
	Totals	\$23,208.19	\$29,235.99	\$1,573.33	\$54,017.51	42.96%	54.12%	2.91%	100.00%

	% Gas	% Electric
Take out taxes	\$52,444.18	44.25% 55.75%

Energy Cost Index \$1.31
 \$/sq ft
 40,000 sq ft

05 / 06

Student Center

% Gas and Electric Charges

Account # 5010-2144-01-2

Building	Date	Gas \$	Electric \$	Tax \$	Total	% Gas	% Electric	% Tax	
Student Center	5/24/05-6/23/05	\$251.23	\$2,740.50	\$89.76	\$3,081.49	8.15%	88.93%	2.91%	100.00%
	6/23/05-7/24/05	\$144.78	\$3,667.48	\$114.36	\$3,926.62	3.69%	93.40%	2.91%	100.00%
	7/24/05-8/23/05	\$146.89	\$3,539.50	\$110.60	\$3,796.99	3.87%	93.22%	2.91%	100.00%
	8/23/05-9/22/05	\$264.40	\$3,148.54	\$102.39	\$3,515.33	7.52%	89.57%	2.91%	100.00%
	9/22/05-10/21/05	\$794.09	\$2,610.20	\$102.13	\$3,506.42	22.65%	74.44%	2.91%	100.00%
	10/21/05-11/21/05	\$2,641.09	\$2,384.14	\$150.75	\$5,175.98	51.03%	46.06%	2.91%	100.00%
	11/21/05-12/22/05	\$5,286.97	\$2,233.42	\$225.61	\$7,746.00	68.25%	28.83%	2.91%	100.00%
	12/22/05-1/25/06	\$3,932.63	\$2,233.42	\$184.98	\$6,351.03	61.92%	35.17%	2.91%	100.00%
	1/25/06-2/23/06	\$3,634.96	\$2,176.92	\$174.36	\$5,986.24	60.72%	36.37%	2.91%	100.00%
	2/23/06-3/23/06	\$2,421.67	\$2,120.41	\$136.26	\$4,678.34	51.76%	45.32%	2.91%	100.00%
	3/23/06-4/24/06	\$1,235.02	\$2,440.65	\$110.27	\$3,785.94	32.62%	64.47%	2.91%	100.00%
	4/24/06-5/23/06	\$664.87	\$2,172.76	\$69.22	\$2,906.85	22.87%	74.75%	2.38%	100.00%
	Totals	\$21,418.60	\$31,467.94	\$1,570.69	\$54,457.23	39.33%	57.78%	2.88%	100.00%

	% Gas	% Electric
Take out taxes	\$52,886.54	40.50% 59.50%

Energy Cost Index \$2.39
 \$/sq ft
 22,157 sq ft

Thomas More College

Energy Cost Index 05 / 06

Energy Cost Index
\$ / Sq ft

Total Campus

7 Buildings 372,364 sq ft 1.26
13 meters

Administration Building	203,669 sq ft	1.15
5 Meter		
Murphy Hall	40,000 sq ft	1.31
1 Meter		
Student Center	22,157 sq ft	2.39
1 Meter		
CCC-Gym	47,000 sq ft	1.26
2 Meters		
Howard /Marian	22,220 sq ft	2.39
1 Meter (gas only)		
Ackerman	36,318 sq ft	2.74
2 Meters		
Observatory		0.22
Electric only		

How do we compare

Source: Building Owners and Managers Association International

ECI (\$/sq ft)	Description
1.44	All Suburban for Cincinnati
1.27	Suburban, 100,000-299,000 sq ft
1.77	Less 5 Stories, 30-39 years old
1.67	30-39 yrs old, 100,000-299,999 sq ft
1.56	AVERAGE

ELF

ELECTRICAL LOAD FACTOR

- Electrical Load Factor (ELF) is a measure of how well the facility's electrical capacity is used on a monthly basis.
- ELF is the ratio of energy consumption to the product of actual demand and the number of hours in the billing period.
- Yields an average fraction of the facility's capacity used during the billing period.

$$\text{ELF} = \frac{\text{Monthly energy consumption (kWh)}}{\text{Monthly billing demand (kW) x Hours per billing period (hrs)}}$$

Benchmarks

Single shift facility (5 days a week at full capacity)	0.20 – 0.25
Two-shift facility	0.45 – 0.60
Three shift facility	0.75 – 0.85
24 hours per day, full load, 365 days a year	1.00

Thomas More College
Electrical Load Factor - ELF
Administration Building
 Fiscal Year 2005 / 2006

Month	Dates	Days	Billing Hours	Energy Consumption kWh	Demand kW	ELF
Jun-05	5/24/05 - 6/23/05	30	720	253,698	630.7	0.56
Jul-05	6/23/05 - 7/24/05	32	768	288,384	635	0.59
Aug-05	7/24/05 - 8/23/05	29	696	275,734	689	0.57
Sep-05	8/23/05 - 9/22/05	30	720	296,732	697.7	0.59
Oct-05	9/22/05 - 10/21/05	29	696	270,038	731.3	0.53
Nov-05	10/21/05 - 11/21/05	31	744	257,511	561.6	0.62
Dec-05	11/21/05 - 12/22/05	31	744	236,186	537.7	0.59
Jan-06	12/22/05 - 1/25/06	34	816	230,999	527	0.54
Feb-06	1/25/06 - 2/23/06	29	696	233,456	544.3	0.62
Mar-06	2/23/06 - 3/23/06	29	696	215,581	503.3	0.62
Apr-06	3/23/06 - 4/24/06	31	744	235,400	670.4	0.47
May-06	4/24/06 - 5/23/06	29	696	217,056	660.1	0.47
Total	Fiscal 06 / 07	364	8736	3,010,775	7388.1	
Average	12 Months	30.3333	728	250898	615.675	0.56

$$\text{ELF} = \frac{\text{Monthly Energy Consumption (kWh)}}{\text{Monthly Billing Demand(kW)} \times \text{Hours per billing period(hrs)}}$$

Single Shift operation 0.20 - 0.25

Two-shift operation 0.45 - 0.60

Three-shift operation 0.75 - 0.85

Thomas More College
Electrical Load Factor - ELF
Administration Building
 Fiscal Year 2006 / 2007

Month	Dates	Days	Billing Hours	Energy Consumption kWh	Demand kW	ELF
Jun-06	5/23/06 - 6/22/06	30	720	246,324	609.5	0.56
Jul-06	6/22/06 - 7/24/06	32	768	276,691	607	0.59
Aug-06	7/24/06 - 8/22/06	29	696	276,376	648	0.61
Sep-06	8/22/06 - 9/21/06	30	720	297,516	708.5	0.58
Oct-06	9/21/06 - 10/20/06	29	696	247,447	676.9	0.53
Nov-06	10/20/06 - 11/20/06	31	744	249,367	544.3	0.62
Dec-06	11/20/06 - 12/21/06	31	744	228,837	535.7	0.57
Jan-07	12/21/06 - 1/24/07	34	816	222,889	520.6	0.52
Feb-07			0			#DIV/0!
Mar-07			0			#DIV/0!
Apr-07			0			#DIV/0!
May-07			0			#DIV/0!
Total	Fiscal 06 / 07	246	5904	2,045,447	4850.5	
Average	12 Months	20.5	492	170454	404.2083	0.86

$$\text{ELF} = \frac{\text{Monthly Energy Consumption (kWh)}}{\text{Monthly Billing Demand(kW)} \times \text{Hours per billing period(hrs)}}$$

Single Shift operation 0.20 - 0.25

Two-shift operation 0.45 - 0.60

Three-shift operation 0.75 - 0.85

Energy Efficient Lamp Alternates

NAED	CURRENT LAMP	HOURS	PRICE	NAED	ALTERNATE	HOURS	PRICE	NOTES
16755	50 R20	2500	\$ 1.46	13942	EL/A R20 12 ALTO 12 WATTS	8000	\$ 9.65	Shaped like an R20 lamp
22239	60A 52A/EW 130V	2830	\$ 0.38	14066	EL/A SWP 16 ALTO 16 WATTS	8000	\$ 8.00	Shaped like an A19 lamp
14007	65BR30 FL 55 130V	2000	\$ 1.50	13939	EL/A BR30 16 ALTO 16 WATTS	8000	\$ 9.65	Shaped like an BR30 lamp
22241	75A 67A /EW 130V	2120	\$ 0.42	14066	EL/A SWP 16 ALTO 16 WATTS	8000	\$ 8.00	Shaped like an A19 lamp
22244	100A 90A/EW 130V	2550	\$ 0.42	13077	SLS 20 ALTO	15,000	\$ 10.00	Compact fluorescent look
13928	120ER40 120V	2000	\$ 4.21	13941	EL/A R40 20 ALTO 20 WATTS	8000	\$ 10.35	Shaped like an an BR40 lamp
24470	F34/CW/RS/EW/ALTO	20,000	\$ 0.97	13783	F32T8ADV841/XEW/LL/ALTO 25 WATT	30,000	\$ 3.95	Ballast change required see below
25686	F40/WW/RS/EW/ALTO	20,000	\$ 1.43	13781	F32T8ADV830/XEW/LL/ALTO 25 WATT	30,000	\$ 3.95	Ballast change required see below
37863	FB34/CW/6/EW	18,000	\$ 4.69	37894	FB32T8/TL741/ALTO	20,000	\$ 5.05	Ballast change required see below
37862	FB34/WW/6/EW	18,000	\$ 5.00	37892	FB32T8/TL730/ALTO	20,000	\$ 5.05	Ballast change required see below
25840	F96T12/CW/EW/ALTO	12,000	\$ 2.35	38806	F96T8/TL741/PLUS/ALTO	24,000	\$ 4.75	Ballast change required see below
27252	F32T8/TL730/ALTO	20,000	\$ 1.62	14771	F32T8ADV830/XEW/LL/ALTO 30 WATT	30,000	\$ 3.00	Operates on same ballast
27249	F32T8/TL735/ALTO	20,000	\$ 1.62	14772	F32T8ADV835/XEW/LL/ALTO 30 WATT	30,000	\$ 3.00	Operates on same ballast
27248	F32T8/TL741/ALTO	20,000	\$ 1.62	14772	F32T8ADV841/XEW/LL/ALTO 30 WATT	30,000	\$ 3.00	Operates on same ballast
34415	MH400/U	20,000	\$ 13.24	39065	MS360/BU/EW	20,000	\$ 22.00	Operates on same ballast
36881	C400S51/Alto HPS (Park Lot)	24,000	\$ 15.66	32292	C360S51/EW	20,000	\$ 26.50	Operates on same ballast
Changes made from T12 to T8 technology require a ballast change however the sockets and light fixture will accept the T8 lamp. For changes to any F32T8 lamp please use the Advance REL series. For the F96T8 use an Advance REL2P59RHTPI \$28.00 each.								